

## EXHIBIT 22

IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF OHIO  
EASTERN DIVISION

IN RE NATIONAL  
PRESCRIPTION OPIATE  
LITIGATION

: MDL No. 2804  
: CASE NO. 17-MD-2804  
: (DAP)  
:

EXPERT REPORT OF CRAIG J. MCCANN, PH.D., CFA  
March 25, 2019

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## **B. MME Conversion Factor**

117. Because each drug can be prescribed in more than one dosage strength (e.g., 5 mg or 10 mg), compiling only the number of pills shipped provides a partial picture of the amount of drugs shipped. Also, since different drugs can have different potencies, compiling only the total weight of active ingredient shipped also provides a partial picture of the amount of drugs shipped.

118. The CDC has published “MME conversion factors” that allow opioids to be directly comparable to one another by converting different drugs and dosage strengths into morphine milligram equivalents.<sup>49</sup> I added the MME conversion factor to the ARCOS Data, matching the NDC in the CDC table to the NDC in the ARCOS Data.

## **C. Additional Pharmacy Information**

119. I supplemented the Buyer Business Activity field with data from the Centers for Medicare and Medicaid Services, which assigns National Provider Identifiers (“NPIs”) to most covered health care providers in the United States. In addition to assigning and tracking NPIs, the Centers for Medicare and Medicaid Services provides a classification of Buyers’ Business Activities that is more detailed than the classification in the ARCOS Data,

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<sup>49</sup> National Center for Injury Prevention and Control. CDC compilation of benzodiazepines, muscle relaxants, stimulants, zolpidem, and opioid analgesics with oral morphine milligram equivalent conversion factors, 2018 version. Atlanta, GA: Centers for Disease Control and Prevention; 2018. Available at [www.cdc.gov/drugoverdose/resources/data.html](http://www.cdc.gov/drugoverdose/resources/data.html).

## State and County Opioid Total Dosage Units Market Share

Company Name	OH		Cuyahoga County	
	Market Share	Total Dosage Units	Market Share	Total Dosage Units
Cardinal Health	23.36%	1,181,793,824	23.07%	100,530,754
McKesson Corporation	15.22%	770,100,781	14.32%	62,375,571
AmerisourceBergen Drug	12.78%	646,772,027	22.11%	96,350,751
Walgreen Co	11.28%	570,655,520	17.02%	74,159,470
CVS	7.98%	403,542,780	9.61%	41,859,800
Wal-Mart	6.28%	317,672,790	2.17%	9,438,765
Kroger	5.90%	298,385,260	0.00%	0
Rite Aid	4.08%	206,362,720	2.32%	10,119,510
Omnicare Distribution Center LLC	2.03%	102,937,195	0.00%	0
Miami-Luken	1.69%	85,388,675	0.02%	72,985
HBC Service Company	1.45%	73,149,760	2.53%	11,008,220
Discount Drug Mart	1.44%	72,847,210	2.75%	11,981,350
H. D. Smith	1.42%	71,931,930	0.56%	2,431,410
Anda, Inc	0.87%	43,933,912	0.81%	3,511,080
Prescription Supply Inc	0.73%	37,115,447	0.68%	2,957,844
Eckerd Corporation	0.50%	25,343,330	1.17%	5,077,810
Frank W Kerr Inc	0.44%	22,494,736	0.00%	300
Value Drug Co	0.43%	21,667,568	0.01%	47,373
Meijer Distribution Inc #90	0.42%	21,352,305	0.00%	0
Quest Pharmaceuticals Inc	0.26%	13,380,565	0.02%	68,740
KeySource Medical	0.24%	12,040,100	0.11%	498,415
The Harvard Drug Group	0.20%	10,082,135	0.14%	599,885
Rochester Drug Co-Operative Inc	0.13%	6,694,640	0.00%	600
River City Pharma	0.13%	6,602,325	0.08%	366,805
Top Rx, Inc.	0.11%	5,361,970	0.01%	42,930
Capital Wholesale Drug & Co	0.09%	4,550,495	0.00%	21,400
Auburn Pharmaceutical	0.06%	3,254,400	0.00%	7,200
Advantage Logistics	0.06%	3,053,950	0.00%	0
Heartland Repack Services	0.06%	2,804,135	0.00%	0
Associated Pharmacies Inc	0.04%	1,928,585	0.00%	0
Henry Schein Inc	0.02%	1,119,015	0.05%	211,660
Safecor Health, LLC	0.02%	1,050,410	0.09%	382,201
Genetco Inc	0.02%	861,780	0.00%	0
Qualitest Pharmaceuticals	0.02%	802,310	0.00%	6,000
Amneal Pharmaceuticals LLC	0.02%	768,000	0.09%	390,000
Dispensing Solutions	0.01%	702,451	0.04%	164,990
Expert-Med	0.01%	692,420	0.00%	7,500
Smith Drug Company	0.01%	669,182	0.04%	169,002
Pharmacy Service Ctr Distr	0.01%	598,180	0.02%	71,235
DRx Pharmaceutical Consultants, Inc.	0.01%	532,527	0.01%	62,966
American Sales Company	0.01%	499,200	0.06%	240,200
Pharmacy Buying Association	0.01%	384,000	0.00%	0
Morris & Dickson Co	0.01%	370,070	0.00%	0
Richie Pharmacal	0.01%	354,340	0.00%	7,900
Physicians Pharmaceutical Corp	0.01%	333,340	0.00%	0
D & K Healthcare Resources	0.01%	327,092	0.00%	0
Actavis Pharma, Inc.	0.01%	275,900	0.00%	100
Prescript Pharmaceuticals	0.01%	275,870	0.00%	2,300
MWI Veterinary Supply	0.01%	274,410	0.00%	16,510
General Injectables & Vaccines, Inc	0.00%	250,900	0.01%	29,500

## Opioid Total MME by Company in Cuyahoga County, OH

Company Name	Market Share	County Population										
		Total MME	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Cardinal Health	31.52%	1,772,506,417	211,558,384	226,171,859	231,753,919	252,864,538	203,528,654	192,162,304	166,465,391	164,037,825	123,963,544	
AmerisourceBergen Drug	25.73%	1,446,867,175	74,341,574	89,417,108	93,430,832	112,487,542	183,416,748	195,494,791	182,084,787	244,368,414	271,825,378	
Walgreen Co	16.01%	900,461,722	102,739,278	113,357,810	124,504,422	127,680,333	137,345,884	138,289,923	120,879,178	31,829,812	3,835,083	
McKesson Corporation	15.27%	858,579,288	73,359,398	82,283,818	88,902,749	96,054,683	97,001,677	109,572,526	106,064,746	101,596,188	103,743,504	
CVS	3.08%	173,363,979	15,250,631	18,711,487	19,561,480	20,950,439	20,865,975	22,003,043	21,976,135	20,512,535	13,532,253	
Wal-Mart	1.28%	71,789,966	5,679,486	6,629,013	7,694,051	9,375,676	9,376,092	9,054,796	8,616,136	5,855,346	9,509,370	
H. D. Smith	1.18%	66,166,989	89,745	117,604	243,688	4,871,771	14,211,080	9,852,110	14,279,640	11,165,625	11,335,725	
Prescription Supply Inc	1.04%	58,441,306	13,734,295	11,283,779	10,684,735	11,633,735	1,510,935	2,535,165	2,751,589	1,931,653	2,375,420	
Anda, Inc	0.89%	50,178,701	1,746,390	1,562,323	2,505,022	2,933,492	1,145,317	2,429,220	3,700,976	14,418,791	19,737,170	
Discount Drug Mart	0.83%	46,893,714	4,264,887	4,919,559	4,964,080	5,606,245	5,607,325	5,580,369	5,472,090	5,306,869	5,172,289	
Rite Aid	0.75%	42,375,835	6,876,206	8,220,480	7,830,624	5,406,939	4,953,934	2,931,133	2,442,396	2,393,685	1,320,437	
HBC Service Company	0.75%	42,100,926	0	0	0	1,333,997	8,305,011	9,733,591	9,062,796	8,198,571	5,466,961	
Eckerd Corporation	0.37%	20,985,763	0	0	0	2,196,444	2,757,281	4,621,879	4,601,969	4,392,040	2,416,150	
KeySource Medical	0.25%	14,107,055	26,018	500,462	112,977	6,366,092	4,988,634	2,112,872	0	0	0	
West-Ward Pharmaceutical Corp.	0.22%	12,310,225	0	0	0	2,120,858	1,713,233	699,334	8,200,802	944,621	19,552	
Fagron Inc	0.17%	9,780,294	926,196	1,861,160	1,840,476	2,120,858	1,713,233	291,484	207,063	207,063	120,490	
Hospira Worldwide LLC	0.12%	6,591,230	0	0	40,304	187,257	574,736	1,496,509	3,494,472	796,073	1,880	
The Harvard Drug Group	0.06%	3,528,616	449,104	515,470	463,131	514,809	69,157	1,424,120	65,233	24,565	3,027	
River City Pharma	0.05%	2,919,369	3,315	0	9,512	465,789	552,747	1,346,558	487,484	21,686	32,278	
Henry Schein Inc	0.04%	2,093,698	159,333	144,199	135,264	107,329	144,866	279,383	335,320	233,058	554,945	
Akorn, Inc.	0.04%	2,038,285	0	0	0	0	0	0	294,910	1,743,375	0	
Smith Drug Company	0.03%	1,487,869	0	11,211	49,380	130,810	222,911	281,785	303,539	280,064	208,170	
Amnol Pharmaceuticals LLC	0.02%	1,325,826	0	0	0	0	0	0	0	0	1,325,826	
Safecor Health, LLC	0.02%	1,271,296	0	0	0	0	940	8,313	99,105	954,742	208,196	
PSS World Medical Inc	0.02%	1,192,883	272,869	155,286	182,675	177,526	166,566	165,631	72,331	0	0	
MWI Veterinary Supply	0.02%	1,111,976	0	303	1,438	5,089	38,094	103,960	149,815	137,021	676,257	
American Sales Company	0.02%	1,077,349	1,077,349	0	0	0	0	0	0	0	0	
Fisher Clinical Services Inc	0.02%	1,037,766	508,472	406,249	1,076	0	0	0	114,707	7,262	0	
Baxter Healthcare Corp	0.02%	884,536	0	0	0	4,136	880,400	0	0	0	0	
Value Drug Co	0.01%	807,273	0	0	0	0	0	0	0	0	0	
Miami-Luken	0.01%	698,012	688,931	8,022	605	454	0	0	0	0	0	
Dispensing Solutions	0.01%	627,327	0	0	0	73,819	121,720	178,985	153,224	99,579	0	
Priority Healthcare	0.01%	589,832	82,314	49,854	56,395	70,750	66,897	58,183	74,062	61,760	69,617	
Quest Pharmaceuticals Inc	0.01%	561,456	0	0	23,059	113,867	58,287	47,675	295,377	23,191	0	
ACE Surgical Supply Co Inc	0.01%	468,215	77,500	75,500	78,700	74,575	76,706	67,876	11,043	240	6,075	
Patterson Logistics Services	0.01%	401,155	0	0	0	0	3,951	10,865	13,497	137,010	235,833	
Professional Vet Products	0.01%	394,428	41,880	84,063	102,853	110,434	55,197	0	0	0	0	
Pharmacy Service Ctr Distr	0.01%	354,958	71,915	70,308	94,827	65,651	44,099	8,158	0	0	0	
Almac Clinical Services, Inc.	0.01%	325,967	0	0	0	0	0	0	217,312	108,656	0	
Darby Dental Supply, LLC	0.01%	322,080	220,726	27,575	40,893	14,530	7,265	5,585	908	2,724	1,874	

## State and County Opioid Total Dosage Units Market Share

Company Name	OH		Summit County	
	Market Share	Total Dosage Units	Market Share	Total Dosage Units
Cardinal Health	23.36%	1,181,793,824	21.46%	56,478,170
McKesson Corporation	15.22%	770,100,781	21.44%	56,430,209
AmerisourceBergen Drug	12.78%	646,772,027	21.19%	55,775,794
Walgreen Co	11.28%	570,655,520	13.70%	36,069,760
CVS	7.98%	403,542,780	9.04%	23,802,420
Wal-Mart	6.28%	317,672,790	2.05%	5,391,170
Kroger	5.90%	298,385,260	0.00%	0
Rite Aid	4.08%	206,362,720	3.22%	8,485,870
Omnicare Distribution Center LLC	2.03%	102,937,195	0.01%	13,600
Miami-Luken	1.69%	85,388,675	1.08%	2,848,475
HBC Service Company	1.45%	73,149,760	3.54%	9,316,960
Discount Drug Mart	1.44%	72,847,210	1.31%	3,441,010
H. D. Smith	1.42%	71,931,930	0.03%	68,145
Anda, Inc	0.87%	43,933,912	0.67%	1,758,265
Prescription Supply Inc	0.73%	37,115,447	0.01%	19,300
Eckerd Corporation	0.50%	25,343,330	0.90%	2,372,920
Frank W Kerr Inc	0.44%	22,494,736	0.00%	0
Value Drug Co	0.43%	21,667,568	0.00%	0
Meijer Distribution Inc #90	0.42%	21,352,305	0.00%	0
Quest Pharmaceuticals Inc	0.26%	13,380,565	0.00%	1,300
KeySource Medical	0.24%	12,040,100	0.01%	16,490
The Harvard Drug Group	0.20%	10,082,135	0.05%	131,600
Rochester Drug Co-Operative Inc	0.13%	6,694,640	0.00%	8,235
River City Pharma	0.13%	6,602,325	0.04%	94,990
Top Rx, Inc.	0.11%	5,361,970	0.00%	700
Capital Wholesale Drug & Co	0.09%	4,550,495	0.00%	2,500
Auburn Pharmaceutical	0.06%	3,254,400	0.08%	209,960
Advantage Logistics	0.06%	3,053,950	0.00%	0
Heartland Repack Services	0.06%	2,804,135	0.00%	0
Associated Pharmacies Inc	0.04%	1,928,585	0.01%	37,600
Henry Schein Inc	0.02%	1,119,015	0.03%	81,170
Safecor Health, LLC	0.02%	1,050,410	0.00%	0
Genetco Inc	0.02%	861,780	0.00%	2,100
Qualitest Pharmaceuticals	0.02%	802,310	0.00%	0
Amneal Pharmaceuticals LLC	0.02%	768,000	0.00%	0
Dispensing Solutions	0.01%	702,451	0.00%	4,440
Expert-Med	0.01%	692,420	0.00%	2,500
Smith Drug Company	0.01%	669,182	0.00%	0
Pharmacy Service Ctr Distr	0.01%	598,180	0.01%	21,205
DRx Pharmaceutical Consultants, Inc.	0.01%	532,527	0.01%	18,134
American Sales Company	0.01%	499,200	0.03%	87,600
Pharmacy Buying Association	0.01%	384,000	0.00%	0
Morris & Dickson Co	0.01%	370,070	0.00%	0
Richie Pharmacal	0.01%	354,340	0.00%	1,000
Physicians Pharmaceutical Corp	0.01%	333,340	0.00%	0
D & K Healthcare Resources	0.01%	327,092	0.00%	0
Actavis Pharma, Inc.	0.01%	275,900	0.00%	100
Prescript Pharmaceuticals	0.01%	275,870	0.00%	0
MWI Veterinary Supply	0.01%	274,410	0.00%	11,130
General Injectables & Vaccines, Inc	0.00%	250,900	0.00%	0

## Opioid Total MME by Company in Summit County, OH

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County Population		Total MME										
Company Name	Market Share	MME	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Cardinal Health	29.17%	1,094,306,610	109,945,174	120,729,880	134,595,363	166,421,419	142,185,012	109,793,985	98,636,285	102,858,116	109,141,375	
AmersourceBegen Drug	26.01%	975,859,370	104,837,042	112,001,944	73,707,661	59,918,202	125,431,261	147,929,274	145,576,933	124,639,357	81,817,697	
McKesson Corporation	25.18%	944,639,007	64,615,079	75,326,267	92,025,606	100,767,249	99,622,867	112,858,772	109,216,034	144,592,405	145,614,728	
Walgreen Co	10.77%	404,162,318	42,298,424	48,542,791	53,098,944	58,638,984	65,393,996	62,985,269	55,986,121	15,239,799	1,977,989	
CVS	2.44%	91,634,443	7,735,298	9,648,482	9,957,458	11,317,292	11,277,436	12,074,340	11,639,009	10,619,296	7,365,832	
Anda, Inc	1.27%	47,823,397	23,113,707	18,494,173	199,496	1,068,668	785,565	1,485,215	1,991,707	522,250	162,617	
Miami-Luken	1.24%	46,541,721	2,874,541	2,981,400	4,170,946	5,686,830	7,165,433	6,459,756	6,137,244	5,441,691	5,623,880	
Wal-Mart	1.12%	42,168,558	4,581,255	5,419,610	5,299,513	5,653,210	5,248,139	4,793,747	3,654,359	2,923,520	4,595,205	
HBC Service Company	0.91%	34,241,388	0	0	0	985,080	6,273,857	7,638,028	7,568,525	6,949,840	4,826,058	
Rite Aid	0.85%	32,036,395	4,786,038	5,616,594	5,748,119	3,409,806	93,330	3,800,833	3,548,284	3,274,880	1,758,510	
Discount Drug Mart	0.33%	12,518,489	1,111,471	1,324,559	1,375,870	1,541,632	1,525,410	1,470,976	1,362,368	1,337,945	1,468,258	
Eckerd Corporation	0.24%	9,021,990	0	0	0	1,563,573	4,772,779	805,493	672,011	588,840	619,295	
KeySource Medical	0.08%	2,947,595	0	0	547,041	470,315	1,447,043	483,197	0	0	0	
Amatheon Inc	0.07%	2,568,047	0	0	66,300	238,567	500,046	343,489	396,010	432,942	590,694	
Auburn Pharmaceutical	0.04%	1,565,315	220,971	7,856	538,832	114,370	110,217	133,590	98,553	191,395	149,531	
PSS World Medical Inc	0.03%	1,265,285	409,567	168,590	164,902	226,520	117,775	118,928	59,004	0	0	
Henry Schein Inc	0.03%	1,256,372	76,936	83,178	68,980	51,467	85,483	66,428	90,974	102,214	630,712	
Almac Clinical Services, Inc.	0.02%	761,726	112,320	0	0	0	64,838	173,100	293,332	90,972	27,164	
The Harvard Drug Group	0.02%	710,056	605	104,511	238,548	304,484	23,232	15,845	15,438	605	6,787	
H. D. Smith	0.01%	468,812	0	0	0	0	90,237	178,876	196,672	0	3,027	
River City Pharma	0.01%	461,355	0	3,784	0	85,505	3,930	27,092	24,216	200,115	116,714	
MWI Veterinary Supply	0.01%	443,562	4,238	3,330	2,292	1,800	43,133	133,576	87,509	81,618	86,066	
Southern Anesthesia & Surgical, Inc.	0.01%	380,191	0	0	0	0	0	0	39,219	171,751	169,221	
Priority Healthcare	0.01%	366,734	24,269	25,048	37,354	77,589	49,314	50,571	36,185	32,168	34,237	
American Sales Company	0.01%	365,639	365,639	0	0	0	0	0	0	0	0	
Butler Animal Health Supply	0.01%	358,824	22,137	22,083	35,832	234,314	44,458	0	0	0	0	
Rochester Drug Co-Operative Inc	0.01%	269,151	1,788	22,694	152,611	82,070	2,421	7,568	0	0	0	
Prescription Supply Inc	0.01%	264,716	2,252	143	0	63,907	42,696	1,278	27,038	120,691	6,711	
PD-Rx Pharmaceuticals Inc	0.01%	246,467	40,955	73,996	102,040	28,454	0	0	0	1,022	0	
Fisher Clinical Services Inc	0.01%	210,147	95,668	3,972	0	13,642	0	96,864	0	0	0	
Patterson Logistics Services	0.00%	170,924	0	0	0	0	22,340	32,349	20,618	74,733	20,885	
Expert-Med	0.00%	158,300	1,949	156,350	0	0	0	0	0	0	0	
JOM Pharmaceutical Services, Inc.	0.00%	156,862	0	0	0	0	156,862	0	0	0	0	
Midwest Veterinary Supply Inc	0.00%	155,446	303	605	286	0	0	0	303	50,876	103,073	
Associated Pharmacies Inc	0.00%	140,530	0	0	0	0	0	0	143	75,783	64,604	
Pharmacy Service Ctr Distr	0.00%	138,773	14,712	11,622	8,703	5,946	24,471	26,733	21,890	16,296	8,400	
Independent Pharmacy Cooperative	0.00%	133,075	0	0	0	0	0	0	0	0	133,075	
Fagron Inc	0.00%	117,493	0	0	0	56,400	0	553	0	0	0	
Watson Pharma Inc	0.00%	90,000	0	0	90,000	0	0	0	0	0	0	
Medisca Inc.	0.00%	76,730	0	15,135	0	0	15,135	0	0	39,673	6,787	
DRx Pharmaceutical Consultants, Inc.	0.00%	60,199	34,045	15,007	9,548	1,598	0	0	0	0	0	
Smith Medical Partners LLC	0.00%	53,196	0	0	0	0	53,196	0	0	0	0	
Darby Dental Supply, LLC	0.00%	52,034	7,357	6,811	3,632	9,081	6,659	6,054	4,238	4,843	3,359	